

CLAIMS

What is claimed is:

1. A prepolymer composition for preparing sealant and coating compositions, comprising
 - a) prepolymers comprising terminal NCO groups that are end-capped with silane groups or with silane groups and alcohol groups, and
 - b) an excess of unreacted aromatic alcohol.
2. The prepolymer composition of claim 1 wherein the unreacted alcohol has a molecular weight of less than 2000.
3. The prepolymer composition of claim 1 wherein the excess of unreacted aromatic alcohol in the composition is from greater than 0% to 15% by mole of the end-capped NCO groups in the prepolymer.
4. The prepolymer composition of claim 3 wherein the excess of unreacted aromatic alcohol in the composition is greater than 2% by mole of the end-capped NCO groups in the prepolymer .
5. The prepolymer composition of claim 1,

wherein the composition further comprises an excess of unreacted aliphatic alcohol,
wherein the excess of unreacted aliphatic alcohol in the composition is less than the excess of aromatic alcohol in the composition, and

wherein the excess of unreacted aliphatic alcohol in the composition is less than 5% by mole of the end-capped NCO groups in the prepolymer.
6. The prepolymer composition of claim 1 wherein from 50% to 100% of the NCO groups are end-capped with silane end-capping groups and wherein from 0% to 50% of the NCO groups on the prepolymer are end-capped with aromatic alcohol end-capping groups, or aliphatic alcohol end-capping groups, or a combination of aromatic and aliphatic alcohol end-capping groups.

7. The prepolymer composition of claim 1 wherein from 70% to 100% of the NCO groups on the prepolymer are end-capped with silane end-capping groups and wherein from 0% to 30% of the NCO groups on the prepolymer are end-capped with end-capped with aromatic alcohol end-capping groups, or aliphatic alcohol end-capping groups, or a combination of aromatic and aliphatic alcohol end-capping groups.

8. The prepolymer composition of claim 1 wherein from 80% to 100% of the NCO groups on the prepolymer are end-capped with silane end-capping groups and wherein from 0% to 20% of the NCO groups on the prepolymer are end-capped with end-capped with aromatic alcohol end-capping groups, or aliphatic alcohol end-capping groups, or a combination of aromatic and aliphatic alcohol end-capping groups.

9. The prepolymer composition of claim 1, wherein said composition further comprises a moisture scavenger.

10. The prepolymer composition of claim 9 wherein the moisture scavenger is selected from the group consisting of vinyltrimethoxysilane, methyltrimethoxysilane, hexamethyldisilazane, paratoluene sulfonyl isocyanate (PTSI), toluene diisocyanate (TDI), diphenyl methane diisocyanate (MDI), and polymeric MDI.

11. A prepolymer composition for preparing sealant and coating compositions, comprising

a) prepolymers comprising terminal NCO groups that are end-capped with silane groups or a combination of silane groups and aromatic alcohol groups, and

b) an excess of an aromatic alcohol having a weight average molecular weight of less than 2000.

wherein from 50% to 100% of the NCO groups on the prepolymers are end-capped with silane end-capping groups and wherein from 0% to 50% of the NCO groups on the prepolymers are end-capped with aromatic alcohol end-capping groups, and

wherein the excess aromatic alcohol in the composition is from greater than 0% to 15% by mole of the end-capped NCO groups in the prepolymer.

12. A method of preparing a prepolymer composition;

a) reacting a hydroxyterminated polymer with an organic isocyanate have 2 or more isocyanate groups to provide a prepolymer comprising terminal NCO groups;

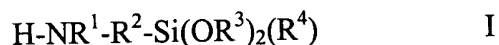
b) reacting the prepolymers of step (a) with silane capping agent to provide a prepolymer in which from 50% to 100% of the NCO groups on the prepolymer are end capped with a silane group;

c) optionally reacting the partially silane end-capped prepolymer of step (b) with an aromatic alcohol, an aliphatic alcohol, or a combination of an aromatic alcohol and an aliphatic alcohol to provide a polyurethane prepolymer that is partially end-capped with silane groups and partially end capped with alcohol groups.

d) reacting the prepolymer of step (b) or step (c) with a sufficient amount of an aromatic alcohol to provide a prepolymer composition comprising a fully end-capped NCO groups and an excess of aromatic alcohol.

13. The method of claim 12 wherein step d comprises reacting the prepolymer that is partially or fully end capped with silane group with a level of alcohol, said level being from greater than 0% to 65% by mole of the level of original NCO groups in the prepolymer.

14. The method of claim 12 wherein the silane capping agent has the following formula:



wherein R^1 represents hydrogen, a substituted aliphatic, cycloaliphatic, and/or aromatic hydrocarbon radical containing 1 to 10 carbon atoms, a second $\text{-R}^2\text{-Si(OR}^3\text{)}_2\text{(R}^4\text{)}$, or $\text{-CHR}^5\text{-CHR}^6\text{COOR}^7$ where R^5 and R^6 are H or C_{1-6} organic moiety, and R^7 is C_{1-10} organic moiety,

R^2 represents a linear or branched alkylene radical containing 1 to 8 carbon atoms,

R^3 represents a C_{1-6} alkyl group, and

$\text{R}^4 = \text{-CH}_3, \text{-CH}_2\text{CH}_3, \text{or OR}^3$.

15. The method of claim 12 wherein the silane capping agent is selected from the group consisting of N-phenylaminopropyltrimethoxysilane, N-ethylaminoisobutyltrimethoxysilane, gamma-aminopropyltrimethoxysilane, gamma-aminopropyltriethoxysilane, the reaction product of an aminosilane with an acrylaic monomer, mercaptosilane, the reaction product of a mercaptosilane with a monoepoxide, and the reaction product of an epoxysilane with a secondary amine.
16. The method of claim 12 wherein the hydroxy-terminated polymer has a weight average molecular weight of from 500 to 18000.
17. The method of claim 12 wherein the aromatic alcohol has a molecular weight of less than 2000.
18. The method of claim 12 wherein the aromatic alcohol is selected from the group consisting of phenol, 3-methoxyphenol, 4-methoxyphenol, nonylphenol, meta-cresol, para-cresol, 4-chlorophenol, meta-hydroxybenzaldehyde, ortho-hydroxybenzaldehyde, para-hydroxybenzaldehyde, hydroquinone, 1-hydroxy-2-propanone, 3-hydroxyacetophenone, and 4-hydroxyacetophenone.
19. The method of claim 12 wherein the amount of aromatic alcohol that is reacted with the silane end-capped prepolymer is from greater than 0% to 65% by mole of the original NCO groups in the prepolymer.
20. The method of claim 8 wherein from 85% to 100% of the NCO groups in the prepolymer are end-capped with silane groups, and

wherein the amount of aromatic alcohol that is reacted with the silane end-capped polyurethane prepolymer is from greater than 0% to 30% by mole of the original NCO groups in the prepolymer
21. The method of claim 12 wherein the hydroxy-terminated polymer is reacted with an aliphatic isocyanate.

22. The method of claim 12 wherein the aliphatic isocyanate is isophorone diisocyanate or dicyclohexyl methane- 4,4'- diisocyanate, or a mixture of isophorone diisocyanate and dicyclohexyl methane- 4,4'- diisocyanate.
23. The method of claim 12 wherein the hydroxy-terminated polymer is selected from the group consisting of a polyether polyol, a polyester polyol, an acrylic polyol, and a hydrocarbon chain comprising 2 or more hydroxyl groups.
24. A sealant composition comprising
- a) a prepolymer composition comprising
 - i) prepolymers comprising terminal NCO groups that are end-capped with silane groups or a combination of silane groups and alcohol-derived end capping groups, wherein said prepolymers have a weight average molecular weight of from 5,000 to 60,000, and
 - ii) an excess of an aromatic alcohol , and
 - b) a catalyst for promoting cross-linking between the prepolymers when the sealant composition is exposed to atmospheric moisture.
25. The sealant composition of claim 24 wherein the excess of unreacted aromatic alcohol in the composition is from greater than 0% to 15% by mole of the end-capped NCO groups in the prepolymer
26. The sealant composition of claim 24 wherein from 50% to 100% of the NCO groups on the prepolymer are end-capped with silane end-capping groups and wherein from 0% to 50% of the NCO groups on the prepolymer are end-capped with aromatic alcohol end-capping groups, or aliphatic alcohol end-capping groups, or a combination of aromatic and aliphatic alcohol end-capping groups.
27. The sealant composition of claim 24 wherein from 70% to 100% of the NCO groups on the prepolymer are end-capped with silane end-capping groups and wherein from 0% to 30% of the NCO groups on the prepolymer are end-capped with with aromatic alcohol end-capping

groups, or aliphatic alcohol end-capping groups, or a combination of aromatic and aliphatic alcohol end-capping groups.

28. The sealant composition of claim 24 wherein from 80% to 100% of the NCO groups on the prepolymer are end-capped with silane end-capping groups and wherein from 0% to 20% of the NCO groups on the prepolymer are end-capped with aromatic alcohol end-capping groups, or aliphatic alcohol end-capping groups, or a combination of aromatic and aliphatic alcohol end-capping groups.

29. The sealant composition of claim 24 further comprising a reinforcing filler.

30. The sealant composition of claim 24 further comprising a moisture scavenger.

31. The sealant composition of claim 24 further comprising an adhesion promoter.

32. A coating composition comprising

a) a prepolymer composition comprising

i) prepolymers comprising terminal NCO groups that are end-capped with silane groups or a combination of silane groups and alcohol-derived end capping groups, wherein said prepolymers have a weight average molecular weight of from 1,000 to 20,000, and

ii) an excess of an aromatic alcohol, and

b) a catalyst for promoting cross-linking between the prepolymers when the coating composition is exposed to atmospheric moisture.